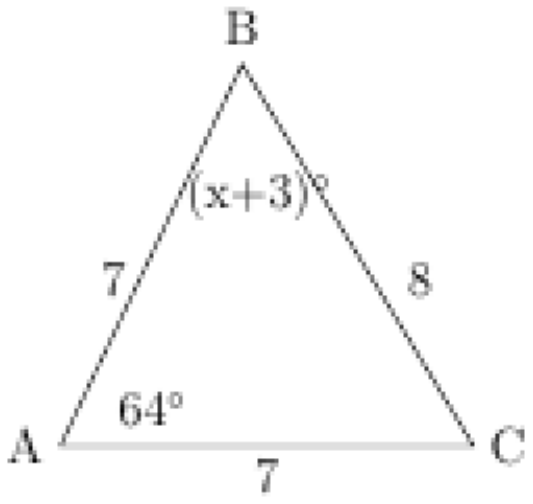
Topic: Isosceles triangle theorem

Question: Solve for the variable.

Find the value of x.



Answer choices:

A 49°

B 52°

C 55°

D 58°

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Solution: C

From what we know, we can say

$\overline{AB} \cong \overline{AC}$ so $\angle B \cong \angle C$ and $m\angle C = (x + 3)^\circ$

The interior angles of a triangle always sum to 180°, so

$$m\angle A + m\angle B + m\angle C = 180^\circ$$

$$64^\circ + x + 3^\circ + x + 3^\circ = 180^\circ$$

$$70^\circ + 2x = 180^\circ$$

$$2x = 110^\circ$$

$$x = 55^\circ$$

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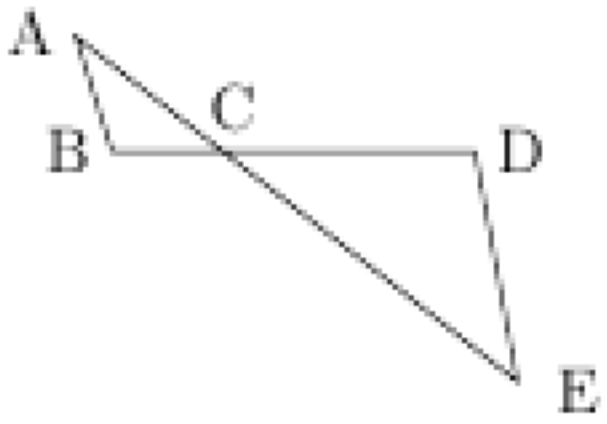
Topic: Isosceles triangle theorem

Question: Find angle measure.

Find the measure of $\angle D$.



$\overline{AB} \cong \overline{BC}$ and $\overline{CD} \cong \overline{DE}$

$m\angle A = 35°$

Answer choices:

A $95°$

B $110°$

C $118°$

D $122°$

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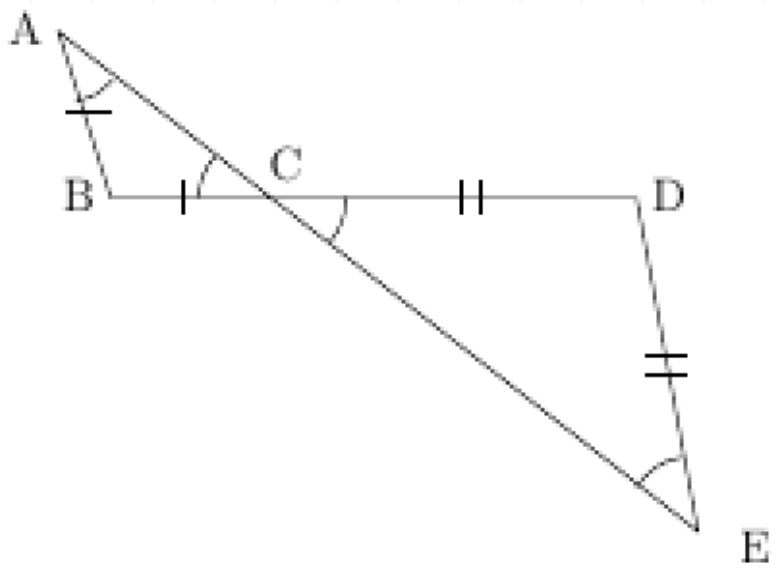
Solution: B

With the given information:



$\overline{AB} \cong \overline{AC}$ so $\angle A \cong \angle ACB$ and $m\angle ACB = 35°$

$m\angle DCE = 35°$ because vertical angles are congruent.

$\overline{CD} \cong \overline{DE}$ so $\angle E \cong \angle DCE$ and $m\angle E = 35°$

The interior angles of a triangle always sum to $180°$, so

$$m\angle DCE + m\angle E + m\angle D = 180°$$

$$35° + 35° + m\angle D = 180°$$

$$m\angle D = 110°$$

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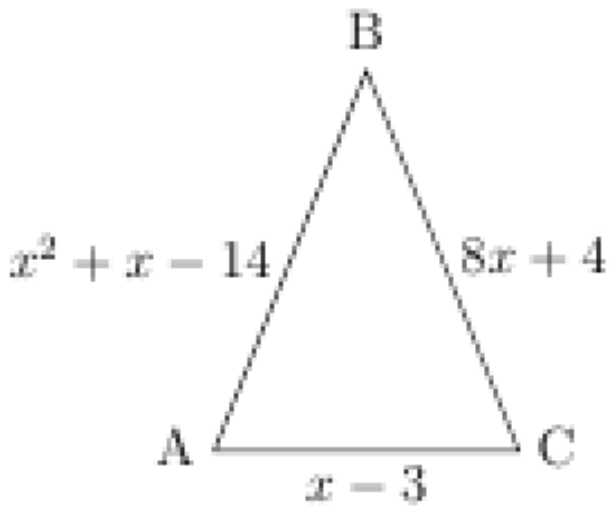
Question: Solve for the variable.

Find the measure of $\overline{AC}$.



Given: $\angle A \cong \angle C$

Answer choices:

A 1

B 2

C 5

D 6

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Solution: D

With the given information,

$$\angle A \cong \angle C \text{ so } BA = BC$$

Substitute the given values for BA and BC and solve.

$$x^2 + x - 14 = 8x + 4$$

$$x^2 - 7x - 18 = 0$$

$$(x - 9)(x + 2) = 0$$

$$x = 9 \text{ or } x = -2$$

Using $x = -2$ will lead to a negative value for BA and BC, so rule out $x = -2$.

That leaves $x = 9$.

$$AC = x - 3 = 9 - 3 = 6$$

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